ISBN 0-7729-4353-2

LEAD CONCENTRATIONS IN SOIL ON RESIDENTIAL, PUBLIC AND PUBLICLY ACCESSIBLE COMMERCIAL PROPERTIES IN THE VICINITY OF TONOLLI COMPANY OF CANADA LTD., MISSISSAUGA - 1987

JULY 1988

Environment Ontario

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Minister

ISBN 0-7729-4353-2

Lead Concentrations in Soil on Residential, Public and Publicly Accessible Commercial Properties in the Vicinity of Tonolli Company of Canada Ltd., Mississauga - 1987

Phytotoxicology Section

Air Resources Branch

ARB No.: ARB-095-88-Phyto

Date : July, 1988

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c Queen's Printer for Ontario, 1988

Concentrations de plomb dans le sol de lieux résidentiels, de lieux publics et de lieux accessibles au public situés à proximité de la Tonolli Company of Canada Ltd., Mississauga, 1987.

Le ministère de l'Environnement a commencé ou annoncé la mise en oeuvre de programmes de remplacement du sol de propriétés résidentielles situées à proximité de deux affineries de plomb de Toronto. La concentration maximale admissible de plomb dans le sol est de 500 µg/g (poids sec).

Une affinerie est également en activité dans les environs de l'intersection Dixie Road et Queensway, à Mississauga. Les émissions continuelles de plomb provenant de Tonolli Company of Canada Ltd. ont provoqué une présence élevée de ce métal dans le sol qui entoure l'affinerie. Les émissions provenant d'une autre usine, celle d'Exide, un fabricant de batteries qui a cessé ses activités en mai 1986, ont également contribué au dépôt de plomb dans le sol. Cependant, étant donné la contribution relativement mineure de l'ancienne usine d'Exide, ce rapport traitera uniquement de la source actuelle de pollution, la Tonolli Company of Canada Ltd.

À la demande des résidents locaux et des autorités du service d'hygiène publique de la région de Peel, le personnel de la Section de phytotoxicologie a recueilli, de mai à juillet, puis d'octobre à décembre 1987, des échantillons de sol d'un certain nombre de lieux résidentiels, de lieux publics et de lieux commerciaux et industriels accessibles au public.

Les analyses effectuées précédemment par la Section de phytotoxicologie (1980 et 1985) avaient révélé l'étendue de la pollution. Le programme d'échantillonnage de 1987 permet de mieux circonscrire la zone polluée. Les responsables du Ministère, les autorités de l'Hygiène publique et les résidents du secteur doivent discuter de la décision à prendre au sujet de l'enlèvement du sol. Le présent rapport fait le point sur les échantillons recueillis à proximité de l'usine Tonolli en 1987. On y mentionne également les données à ce sujet qui ont déjà paru dans deux rapports distincts (ARB-171-87-Phyto et ARB-197-87-Phyto).

Constatations

1. **Sur les 296 propriétés résidentielles (850 sites) soumises à échantillonnage, 74 (154 sites) avaient une concentration de plomb dans le sol (quelle que soit la profondeur) égale ou supérieure à 500 µg/g.**

2. **Sur les 95 lieux publics et lieux industriels et commerciaux accessibles au public, 51 avaient une concentration de plomb dans le sol (quelle que soit la profondeur) égale ou supérieure à 500 µg/g; dans 40 autres, la concentration atteignait ou dépassait 1 000 µg/g.**

3. **La pollution du sol par le plomb diminuait considérablement avec la profondeur quand on descendait de 0-5 cm à 15-20 cm. Pour 86 échantillons de sites résidentiels recueillis à 15-20 cm de profondeur, la moyenne s'établissait à 113 µg/g, par rapport à 599 µg/g à 0-5 cm.**

4. **La carte des concentrations de plomb dans le sol indiquait que la zone polluée (> 500 µg/g de plomb dans le sol) est une zone de forme elliptique qui mesure environ 700 m de diamètre du nord au sud et 1 000 m de diamètre de l'est à l'ouest. La zone regroupe environ 70 propriétés d'habitation, situées pour la plupart au sud-est et, dans une moindre mesure, au sud-ouest de l'intersection Queensway et Dixie Road.**

Lead Concentrations in Soil on Residential, Public and Publicly Accessible Commercial Properties in the Vicinity of Tonolli Company of Canada Ltd., Mississauga, 1987

Introduction

The Ministry of the Environment has soil removal programs underway, or announced, for residential properties in the vicinity of two Toronto secondary lead smelters. The soil replacement guideline for these programs is 500 µg/g lead on a dry weight basis.

A secondary lead smelter also exists in the Dixie Road/Queensway area of Mississauga. Historical emissions of lead from Tonolli Company of Canada Ltd. have contributed to elevated soil lead concentrations in the vicinity of the smelter. Emissions from another source of lead in this area, the Exide plant, a battery manufacturer which ceased operations in May, 1986 also have contributed to the historical deposition of lead in soil. However, in view of the comparatively minor contribution from the former Exide plant this report will refer only to the existing source, the Tonolli Company of Canada Ltd.

In response to requests from local residents and Peel Region Public Health Department authorities, staff from the Phytotoxicology Section conducted soil sampling on a number of residential, public and publicly accessible commercial/industrial sites from May to July and from October to December, 1987. Previous Phytotoxicology Section assessment surveys (1980 and 1985) gave an indication of the extent of soil contamination. The 1987 sampling program allows a more precise determination of the area of concern. A decision regarding soil removal is pending further discussion among Ministry officials, Public Health authorities and residents of the area. This report will serve as a final summation of all soil sampling for lead analysis in the vicinity of the Tonolli plant in 1987. This includes soil lead data previously released in 2 separate reports (ARB-171-87-Phyto and ARB-197-87-Phyto).

Methods

Sampling in October-December, 1987 was conducted on all residential properties which lay within the 500 µg/g soil lead concentration contour obtained from the 1985 Phytotoxicology Section soil assessment survey. Many additional residential properties south and east of the above-mentioned area were sampled earlier in 1987 in response to requests from area residents. The sampling area is shown in Figure 1.

The total number of residential properties sampled was 296 while the total number of sampling sites on these properties was 850. Boulevards fronting residential properties were considered residential sites. Boulevards were sampled on a representative basis, i.e. boulevard samples were not collected at every address. Additionally, a total of 95 sites were sampled on public and publicly accessible commercial/industrial property (Fig. 2). Public properties sampled included boulevards not fronting residential properties, a school yard, Hydro rights-of-way and a GO train station. Publicly accessible commercial/industrial areas sampled included lawns, vacant grassed fields, narrow soil strips and a cultivated field.

In all cases soil sampling was conducted using standard Phytotoxicology Section techniques. Usual sampling depth was 0-5 cm; this depth is generally used for lawns and other uncultivated areas. Shallower sampling (0-2 cm) was required at a few sites where packed and/or very coarse soil was encountered (e.g., on driveways). A sampling depth of 0-15 cm was used for gardens and other cultivated areas. Two separate samples were collected at each site (duplicate sampling) and the results were averaged. Typical residential sampling sites could include a front lawn, front boulevard, back lawn, back vegetable garden, flower bed (if of substantial size), and children's play area (e.g., sandbox). Periodically, a sampling depth of 15-20 cm also was

used to assess the extent of sub-surface soil lead contamination. This sampling depth was used on 86 residential property sites and 13 commercial/industrial/public sites, one sample only per site. In order to minimize contamination from peeling paint, soil cores were not collected closer than 0.5 m from painted exterior surfaces.

All samples were air dried and sieved to 0.35 mm particle size, and were analyzed for lead at the MOE, Laboratory Services Branch.

Results

Table 1 presents results of the 1987 soil lead sampling program on residential properties in the vicinity of the Tonolli plant, Mississauga. Table 2 gives results from public and publicly accessible commercial/industrial properties. Concentrations of lead in excess of 500 µg/g are underlined in Table 1.

Of the 296 residential properties sampled, 74 (25%) had one or more sample sites with greater than, or equal to, 500 µg/g lead in soil (any depth). For 11 of these 74 properties, the only site on the property showing greater than 500 µg/g soil lead was a boulevard. The total number of residential sampling sites with greater than, or equal to, 500 µg/g lead was 154 (18% of the 850 residential sites sampled). Sample sites include 0-5 cm, 0-15 cm and 0-2 cm sampling depths; 15-20 cm samples were considered as representing the same site as the associated 0-5 cm sample.

The maximum soil lead concentration measured for residential property samples was 2800 µg/g (boulevard, Dixie Road). The second highest was 2500 µg/g (front lawn, Dixie Road).

For the 95 public and publicly accessible commercial/industrial sites sampled, 51 (54%) had greater than 500 µg/g lead in soil. Of these, 40 (42%) had a soil lead level greater than 1000 ug/g. The maximum soil

lead concentration measured on these properties was 39,000 µg/g (boulevard on Dixie Road, east of Tonolli Company).

Results of the sub-surface (15-20 cm depth) sampling on both residential sites and public/commercial/industrial sites indicated that soil lead concentrations decreased substantially with increasing depth from 0-5 cm to 15-20 cm. For the 86, 15-20 cm residential site samples the mean value was 113 µg/g; the mean value for the 86 associated 0-5 cm samples was 599 µg/g. Similarly, for the 13, 15-20 cm public and publicly accessible commercial/industrial sites, the mean value was 186 µg/g; for the 13 associated 0-5 cm samples it was 2122 µg/g. In 98 out of 99 cases the soil lead concentration at 0-5 cm exceeded that of the associated 15-20 cm sample; for the exceptional case both values were very low.

Data obtained from the 1987 soil sampling program were used to construct computer-generated contour lines of surface soil lead concentrations in the vicinity of the Tonolli Company. Both 500 µg/g and 1000 ug/g contours are shown in Figure 3. These contours represent 'smoothed' results and should not be considered as exact delineations since soil lead concentrations exhibit considerable variability. The contour lines near Dixie Road south of Kendall Road were modified somewhat to better represent the available data in the area. Since soil lead concentrations in this area decrease rapidly with increasing distance away from Dixie Road, the 500 µg/g and 1000 µg/g contour lines appear to merge in the boulevard strip. Also, the contour lines were left open-ended at the south end of this area as no data were available further south to indicate otherwise. Elongation of the area of contamination south on Dixie Road, and to a lesser extent east and west on the Queensway (primarily boulevard contamination), appears to be due mainly to vehicular emissions.

Summary

1. Of the 296 residential properties (850 sites) sampled, 74 properties (154 sites) had soil lead concentrations (any depth) equal to or exceeding 500 µg/g.

2. Of the 95 public and publicly accessible commercial/industrial sites sampled, 51 had soil lead concentrations (any depth) equal to or exceeding 500 µg/g, while 40 sites equalled or exceeded 1000 ug/g lead.

3. Soil lead contamination decreased substantially with increasing depth from 0-5 cm to 15-20 cm. For 86, 15-20 cm residential site samples the mean was 113 ug/g; the mean value for the 86 associated 0-5 cm samples was 599 µg/g.

4. Contour mapping of soil lead concentrations indicated that the contaminated area (≥500 µg/g soil lead) consists of a roughly elliptical zone extending approximately 700 m in N-S diameter and 1000 m in E-W diameter. The zone includes approximately 70 residential properties, most lying southeast, and to a lesser extent southwest, of the Queensway - Dixie Road intersection.

RR/RE2405

TABLE 1

Soil Lead Concentrations (µg/g dry weight) for Residential Properties in the Vicinity of Tonolli Co. of Canada, Mississauga, 1987

STREET	FRONT YARD	BACK YARD	OTHER
Brentano Blvd.	lawn 175*	lawn 255 garden 175	
Brentano Blvd.	lawn 66	lawn 64 garden 87	
Brentano Blvd.	lawn 81	lawn 84 garden 140	
Brentano Blvd.	lawn 145	lawn 175	W planter 110 E planter 74
Carletta Dr.	lawn 205	lawn 235 sand box 12	
Carletta Dr.	lawn 255 W boulevard 315	lawn 185 E garden 185	W lawn 180
Carletta Dr.	lawn 102	lawn 165 garden 77	
Carletta Dr.	lawn 102	lawn 110 garden 66	
Carletta Dr.	lawn 200	lawn 124	
Carletta Dr.	lawn 125	lawn 125 garden 52 sand box 10	
Carletta Dr.	lawn 175	lawn 165 garden 90	
Courtland Cr.	lawn 130	garden 69	E lawn 115
Denise Rd.	lawn 210	lawn 185 bed 240	
Denise Rd.	lawn 210	lawn 130	
Denise Rd.	lawn 305 bed 80	lawn 140	
Denise Rd.	lawn 110	lawn 195	
Denise Rd.	lawn 245	lawn 97 bed 60	
Denise Rd.	lawn 645*	lawn 430	
Denise Rd.	lawn 160	lawn 220 bed 215	
Denise Rd.	lawn 250	lawn 220	
Denise Rd.	lawn 165	lawn 135 garden 61	
Denise Rd.	lawn 205	lawn 245 bed 150 sand box 4	
Denise Rd.	lawn 140	lawn 145 garden 105	
Denise Rd.	lawn 190		
Denise Rd.	lawn 155 boulevard 440		
Denise Rd.	lawn 195 (32) boulevard 280 (21)	lawn 175 (32) garden 106	
Denise Rd.	lawn 86	lawn 125 garden 66	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Denise Rd.	N lawn 220 N boulevard 255	lawn 220	E side lawn 180
Denise Rd.	lawn 180	lawn 245	
Denise Rd.	lawn 130 (19) boulevard 300	lawn 375 (34)	
Denise Rd.	refused access		
Denise Rd.	lawn 285 boulevard 500 (38)	lawn 390	
Denise Rd.	lawn 385 boulevard 595	lawn 500	
Denise Rd.	lawn ∿ 480 (31) lawn 320	lawn 290 (73) lawn 305 garden 118	side lawn 400
Denise Rd.	lawn 510 boulevard 705 (21)		
Denise Rd.	lawn 410	lawn 320 garden 255	
Denise Rd.	lawn 445 (35) boulevard 785(120)	lawn 480 (150)	
Denise Rd.	lawn 350		
Denise Rd.	lawn 475 boulevard 830 (23)		side lawn 385 (34)
Denise Rd.	lawn 355	lawn 390 garden 175	
Denise Rd.	lawn 490	lawn 425 garden 235	
Denise Rd.	lawn 1050	lawn 395 garden 200	
Denise Rd.	lawn 540	lawn 490	
Denise Rd.	lawn 930 (20) boulevard 1600(29)	lawn 605 (40) garden 260	
Denise Rd.	lawn 410 (140) boulevard 710	lawn 430 (100)	
Denise Rd.	lawn 960	lawn 520 garden 315	
Denise Rd.	bed 66		
Denise Rd.	lawn 515 boulevard 835		
Denise Rd.	lawn 575	lawn 690	
Denise Rd.	lawn 550 (61)	lawn 102	
Denise Rd.	lawn 240		
Denise Rd.	lawn 690 (210 @ 13-18 cm) (140 @ 25-30 cm) boulevard 1350(61)	lawn 475	
Denise Rd.	lawn 535 (180)	lawn 675 (210)	
Denise Rd.	lawn 625	lawn 410 garden 320	
Denise Rd.	lawn 940	lawn 740	
Denise Rd.	lawn 630	lawn 425 garden 350	
Denise Rd.	lawn 950 boulevard 1600	lawn 860	
Denise Rd.	lawn ∿ 490 (150) boulevard 1050	lawn 470 (230) garden 285	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Denise Rd.	lawn 890	lawn 1050 bed 910	
Denise Rd.	lawn 680	lawn 450 garden 315	
Denise Rd.	lawn 730 (250)	lawn 965 (420) garden 760	
Denise Rd.	lawn 820 boulevard 565(110)	lawn 475 garden 455	
Denise Rd.	lawn 890	lawn 1200	
Denise Rd.	lawn 865	lawn 1500	
Denise Rd.	lawn 680	lawn 455	side boulevard 1250 side lawn 760 (120) side garden 385
Denise Rd.	lawn 740 (360)	lawn 1800 (480) garden 930	
Denise Rd.	lawn 445	lawn 2,200 garden 885	
Denise Rd.	lawn 330	lawn^{n} 220 lawn^{o} 715 garden^{o} 985	
Denise Rd.	lawn 995 (450)	lawn 470 (410)	
Denise Rd.	lawn 830	lawn 680	
Denise Rd.	lawn 655 boulevard 1200	lawn 530 (170) garden 500	
Denise Rd.	lawn 610	lawn 500	side lawn 645
Denise Rd.	lawn 655	lawn 570 garden 345	
Denise Rd.	lawn 720	lawn ~480	
Denise Rd.	lawn 490 (76) boulevard 690		side lawn 630
Denise Rd.	lawn 620 boulevard 900(140)	lawn 230	side lawn 515 (140)
Denise Rd.	lawn 635	lawn 325	
Dixie Rd.	lawn 210	lawn 190 garden 125	
Dixie Rd.	lawn 125	lawn 125	
Dixie Rd.	lawn 200	lawn 125 garden 75	
Dixie Rd.	lawn 320 boulevard 735		side lawn 300 (45)
Dixie Rd.	lawn 620 boulevard 825	W lawn 575 E lawn 485	
Dixie Rd.	boulevard 2800	lawn 290 N lawn 255	S side lawn 325 N grassed strip 670 NE grassed strip 845
Dixie Rd.	lawn 1350 boulevard 530	lawn ~490 (57) garden 150	E orchard 440 W orchard 355 side ditch 530 drive 385 (0-2 cm)
Dixie Rd.	boulevard 1450	lawn 655 garden 560	corner boulevard 455 S boulevard 415 side lawn 830

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Dixie Rd.	lawn 600 boulevard 2500(250)	lawn 1000 garden @ } 705 garage }	side garden 515
Dixie Rd.	lawn 620	lawn 660 vineyard 665	S side lawn 825 (52) N side lawn 1250(56)
Dixie Rd.	lawn 795	lawn 655 garden 330	S side lawn 810 N side lawn 795(75)
Dixie Rd.	lawn 810 (350)	lawn 1350 (95) SE garden 680	S side lawn 1450
Dixie Rd.	lawn 905 (S end) lawn 680 (N end)		side lawn 595 side garden 525
Dixie Rd.	lawn 2500 (270)	lawn 665	drive 830 (0-2 cm)
Dixie Rd.	lawn 1250	lawn 1650 (130)	
Family Cres.	lawn 155	lawn 145	
Family Cres.	lawn 180	lawn 210 bed 72	
Family Cres.	lawn 125	lawn 52 garden 71	
Family Cres.	lawn 155	lawn 155 garden 165	
Family Cres.	lawn 165	lawn 220 bed 160	
Family Cres.	lawn 145	lawn 34	
Family Cres.	lawn 160	lawn 135 garden 150	
Feldwood Rd.	lawn 110	lawn 225 garden 175	
Feldwood Rd.	lawn 160	lawn 235	
Feldwood Rd.	lawn 225	lawn 114 garden 110	
Feldwood Rd.	lawn 103	lawn 94	
Feldwood Rd.	lawn 140	lawn 185 bed 88	
Feldwood Rd.	lawn 97	lawn 88 garden 57	
Feldwood Rd.	lawn 140	lawn 105 garden 54	
Feldwood Rd.	lawn 265	lawn 255 garden 225	
Greenhurst Ave.	lawn 108		side lawn 105 side garden 76
Greenhurst Ave.	lawn 120	lawn 135 bed 85	
Greenhurst Ave.	lawn 205	lawn 65 bed 68	
Greenhurst Ave.	lawn 150	lawn 115 bed 130	
Greenhurst Ave.	lawn 140	lawn 145	
Greenhurst Ave.	lawn 160	lawn 175 garden 91	
Greenhurst Ave.	lawn 130	lawn 160	side bed 145

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Greenhurst Ave.	lawn 130	lawn 180	
Greenhurst Ave.	lawn 120	lawn 150 garden 90	
Greenhurst Ave.	lawn 130	lawn 155 garden 87	
Greenhurst Ave.	lawn 135	lawn 99 bed 59	
Greenhurst Ave.	lawn 195	lawn 110	
Greenhurst Ave.	lawn 120	lawn 96 garden 44	
Greenhurst Ave.	lawn 110	lawn 86 garden 54	
Greenhurst Ave.	lawn 88	lawn 93 garden 60	
Greenhurst Ave.	lawn 180	lawn 70 bed 64	
Greenhurst Ave.	lawn 135	lawn 95	
Greenhurst Ave.	lawn 195	lawn 94	
Greenhurst Ave.	lawn 145	lawn 120 bed 84	
Greenhurst Ave.	lawn 64		
Greenhurst Ave.	lawn 105	lawn 105 bed 90	
Greenhurst Ave.	lawn 140	lawn 110	
Greenhurst Ave.	lawn 140	lawn 220 garden 130	
Greenhurst Ave.	lawn 205	lawn 52	
Greenhurst Ave.	lawn 165	garden 200	N side lawn 155 (6) N boulevard 235
Greenhurst Ave.	lawn 115	lawn 92	
Greenhurst Ave.	lawn 150	lawn 105 bed 210	
Greenhurst Ave.	lawn 160	lawn 100 garden 88	
Greenhurst Ave.	lawn 57	lawn 66	
Greenhurst Ave.	lawn 160	lawn 115 garden 66	
Harvest Dr.	lawn 250	lawn 115 garden 67	
Kalligan Ct.	lawn 95	lawn 100	
Kalligan Ct.	lawn 105	lawn 105 garden 76	
Kalligan Ct.	lawn 73	lawn 98 garden 80	
Kalligan Ct.	lawn 100	lawn 71 bed 68	
Kalligan Ct.	lawn 92	lawn 99 bed 73	
Kalligan Ct.	lawn 160	lawn 61	side bed 70
Kalligan Ct.	lawn 125	lawn 55 garden 105	
Kalligan Ct.	lawn 115		

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Kalligan Ct.	lawn 195	lawn 135 garden 62	
Kalligan Ct.	lawn 120	lawn 115 garden 84	
Kalligan Ct.	lawn 140	lawn 205 bed 125	
Laughton Ave.	lawn 92	lawn 155 garden 83	
Laughton Ave.	lawn 210	lawn 180 bed 115	
Laughton Ave.	lawn 185	garden 50	side lawn 180
Melton Dr.	lawn 66		E lawn 66 W lawn 72
Melton Dr.	lawn 57 boulevard 110	S lawn 91 garden 44	
Melton Dr.	lawn 105	lawn 92 play area/ garden 60	
Melton Dr.	lawn 195	lawn 150 (100)	
Melton Dr.	lawn 155	lawn 165 garden 115	
Melton Dr.	lawn 160	lawn 165 (48)	
Melton Dr.	lawn 185 (22)	lawn 180 (34)	
Melton Dr.	lawn 270	lawn 345	
Melton Dr.	lawn 275	lawn 325	
Melton Dr.	lawn 230 grassed ditch 270	lawn lawn 245	
Melton Dr.	lawn 275 (76)	lawn 250 (33)	
Melton Dr.	lawn 345	lawn 260	
Melton Dr.	lawn 295 grassed ditch 175 drive 300 (0-2 cm)	lawn 305	
Melton Dr.	lawn 55	lawn 51	
Nida Ct.	lawn 165	lawn 190 NW garden 175 S garden 67	S side lawn 160
Nida Ct.	lawn 125 boulevard 175		side lawn 120
Nida Ct.	lawn 150 boulevard 210	lawn 120	
Nida Ct.	lawn 215	lawn 195 (18) corner lawn 160 sand pit 18 garden 105	gravel driveway 765 (0-2 cm)
Nida Ct.	lawn 225 (36) boulevard 395	lawn 180 (67)	
Nida Ct.	lawn 170	lawn 155	side lawn 280
Pagehurst Ct.	lawn 44	lawn 26 garden 22	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Promenade Ct.	lawn 53	lawn 49 garden 43	
Promenade Ct.	lawn 70 boulevard 66	lawn 74	
Promenade Ct.	lawn 75	lawn 47 garden 58	
Promenade Ct.	lawn 93	lawn 50 garden 64	
Promenade Ct.	lawn 195	lawn 62 (69) garden 49	
Proverbs Dr.	lawn 155	lawn 94 garden 160	
Proverbs Dr.	lawn 140	lawn 155 garden 120	
Proverbs Dr.	lawn 255	lawn 370 garden 205	
Proverbs Dr.	lawn 170	lawn 210 garden 210	
Proverbs Dr.	lawn 305	lawn 295 garden 150	
Proverbs Dr.	lawn 240	lawn 260	
Proverbs Dr.	lawn 270	lawn 285 garden 160	
Proverbs Dr.	lawn 135	lawn 110 garden 140	
Proverbs Dr.	lawn 295	lawn 295 garden 490	
Proverbs Dr.	lawn 120	lawn 105	side bed 95
Proverbs Dr.	lawn 230	lawn 245 garden 260	
Proverbs Dr.	lawn 260		
Proverbs Dr.	lawn 155	lawn 130 garden 145	
Proverbs Dr.	lawn 240	lawn 92 garden 93	
Safeway Cres.	lawn 190	lawn 175	garden 275
Safeway Cres.	lawn 265	lawn 260 garden 580	
Safeway Cres.	lawn 325	lawn 355 garden 160	
Safeway Cres.	lawn 135	lawn 145 garden 89	
Safeway Cres.	lawn 265	lawn 345 garden 290	
Safeway Cres.	lawn 245 (175)	lawn 295 (260) W garden 225 E garden 190	
Safeway Cres.	lawn 365	lawn 290 garden 430	
Safeway Cres.	lawn 375 boulevard ~480	lawn 360 N garden 440 S garden 360	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Safeway Cres.	lawn 275	lawn 360 (230) N garden 345 S garden 370 lawn 290	
Safeway Cres.	lawn 310 boulevard 520	N garden 335 S garden 340	
Safeway Cres.	lawn 375	lawn 445 garden 230	
Safeway Cres.	lawn 415	lawn 470	
Safeway Cres.	lawn 340	lawn 580	
Safeway Cres.	lawn 280	lawn 305 garden 250	
Safeway Cres.	lawn 390	lawn 530 garden 290	
Safeway Cres.	lawn 355	lawn 395 garden 385	
Safeway Cres.	lawn 370	lawn 450 garden 315	
Safeway Cres.	lawn 385	lawn 420	
Safeway Cres.	lawn 270		
Safeway Cres.	lawn 250 (80) boulevard 150 (33)	lawn 315 (76)	
Safeway Cres.	lawn 170		
Safeway Cres.	lawn 250	lawn 345 bed 230	
Safeway Cres.	lawn 315	lawn 370 garden 345	
Safeway Cres.	lawn 260	lawn 365 garden 315	
Safeway Cres.	lawn 300	bed 145	
Safeway Cres.	lawn 210	lawn 200 garden 140	
Safeway Cres.	lawn 300	lawn 390 garden 220	
Safeway Cres.	lawn 125	lawn 155 garden 85	
Safeway Cres.	lawn 170	lawn 140	
Safeway Cres.	lawn 155	lawn 140 garden 120	
Sherway Dr.	lawn 125	lawn 175 garden 75	
Sherway Dr.	lawn 215	lawn 260 play area 150 garden 180	
Sherway Dr.	lawn 140	lawn 100 garden 140	
Sherway Dr.	lawn 155	lawn 185 garden 85	
Sherway Dr.	lawn 235		side lawn 200
Sherway Dr.	lawn 110	lawn 98 garden 72	
Sherway Dr.	lawn 170	lawn 175 garden 175	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Sherway Dr.	lawn 245		side lawn 140 garlic bed 140
Sherway Dr.	lawn 155 boulevard 590	lawn 145	
Sherway Dr.	lawn 76	lawn 99 garden 150	
Sherway Dr.	lawn 58	lawn 31 bed 39	
Sherway Dr.	lawn 135	lawn 89 garden 110	
Sherway Dr.	lawn 47	lawn 75 garden 55	
Sherway Dr.	lawn 140	lawn 102	
Sherway Dr.	lawn 145	lawn 87 garden 135	
Sherway Dr.	lawn 135	lawn 95 garden 38	
Sherway Dr.	lawn 88	lawn 66 garden 65	
Sherway Dr.	lawn 42	lawn 38 garden 44	
Sherway Dr.	lawn 93		
Sherway Dr.	lawn 140	lawn 155 garden 135	
Sherway Dr.	lawn 98	lawn 93	
Sherway Dr.	lawn 70		
Sidney Dr.	lawn 330 (86) S side/front 440	lawn 345 garden 160	N side lawn 455
Sidney Dr.	lawn 420 grassed ditch 205	lawn 460 garden 295	
Sidney Dr.	lawn 335	lawn 515	
Sidney Dr.	lawn 520 (150)	lawn 710 (220)	side lawn 2150
Sidney Dr.	lawn 605 (130) grassed ditch 600	lawn 840 (210)	
Sidney Dr.	lawn 360	lawn 620	
Sidney Dr.	lawn 540	lawn 620	N side lawn ~475 (200) side garden 450
Stanfield Rd.	lawn 47	lawn 110 garden 27	
Sunnycove Dr.	lawn 210	lawn 175 garden 155	
Sunnycove Dr.	lawn 240	lawn 165 garden 155	
Sunnycove Dr.	lawn 205	lawn 180 garden 260	
Sunnycove Dr.	lawn 215	lawn 350 garden 290	
Sunnycove Dr.	lawn 165	lawn 220	
Sunnycove Dr.	lawn 350	lawn 340 garden 345	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Sunnycove Dr.	lawn 450		
Sunnycove Dr.	lawn 300	lawn 370 garden 295	
Sunnycove Dr.	lawn 175		
Sunnycove Dr.	lawn 220	lawn 165	
Sunnycove Dr.	lawn 150	lawn 155 garden 105	
Sunnycove Dr.	lawn 95		
Sunnycove Dr.	lawn 130	lawn 125	
Sunnycove Dr.	lawn 150	lawn 71 garden 155	
Sunnycove Dr.	lawn 120	lawn 270 garden 280	
Sunnycove Dr.	lawn 88	lawn 190	
Sunnycove Dr.	lawn 110	lawn 110 garden 90	
Sunnycove Dr.	lawn 70		side lawn 91
Venta Ave.	lawn 190	lawn 240 garden 295	
Venta Ave.	lawn 585 (62) boulevard 580 (42)	lawn 670	
Venta Ave.	lawn 190	lawn 190 garden 270	
Venta Ave.	lawn 675 (200) boulevard 655	lawn 685 garden 515	
Venta Ave.	lawn 79	lawn 220 garden 300	
Venta Ave.	lawn 380 boulevard 580	lawn 510	
Venta Ave.	lawn 500	lawn 560	
Venta Ave.	lawn 225	lawn 225 garden 275	
Venta Ave.	lawn 370 (110) boulevard 340 (44)	lawn 405 (190) garden 290	
Venta Ave.	lawn 420	lawn 455	
Venta Ave.	lawn 295 boulevard 525 (93)	lawn 530 garden 320	
Venta Ave.	lawn 385 (22)	lawn 160 (54) garden 125 bed 38	
Venta Ave.	lawn 365	lawn 420 garden 180	
Venta Ave.	lawn 390 boulevard 585	lawn 325 garden 190	
Venta Ave.	lawn 595 (24) boulevard 875 (15)	lawn 555	
Venta Ave.	lawn 385	lawn 270 garden 125	
Venta Ave.	lawn 61 boulevard 810 (8)		E side lawn 350 W side lawn 490(24)
Venta Ave.	lawn 235	lawn 165 garden 115	
Venta Ave.	lawn 655 (17)	lawn 455	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Venta Ave.	lawn 410	lawn 190 garden 165	
Venta Ave.	lawn 370	lawn 285	
Venta Ave.	lawn 615	lawn 350 garden 190	
Venta Ave.	lawn 315 boulevard 530 (30)	lawn 380 (39)	

* Sampling depth was 0-5 cm for lawns, boulevards and other grassed areas; 0-15 cm for cultivated gardens.
* Concentrations exceeding the 500 µg/g "upper limit of normal" guideline are underlined.
()numbers in parentheses refer to the corresponding lead concentration for the 15-20 cm depth
~ one replicate ≥ 500 µg/g, mean < 500
n = new soil
o = original soil

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TABLE 2

Soil Lead Concentrations for Public and Publicly Accessible Commercial/Industrial Properties in the Vicinity of Tonolli Co. (Canada) Ltd., Mississauga, 1987

Location	Loc. Code	Soil Lead Concentration (µg/g) Sampling Depth in cm (0-5)	(15-20)	(0-15)
Dixie Road				
GO Station, N of short grass field	01	250*		
GO Station, NE corner of field	02	50		
GO Station, SE corner of field	03	43		
GO Station, grass strip in SW corner	04	140		
GO Station, boulevard on W side	05	85		
SE corner of Dixie and Blundell intersection	06	470		
boulevard, W side at 2430 Dixie Rd.	07	9300		510
boulevard, W side, front entrance of "Tonolli Co."	08	4050		
boulevard, W side at Tonolli Road	09	39000		
boulevard, NE corner of "Samuel" property	10	13000		
lawn, NE corner of "Samuel" property	11	8400		160
boulevard, W side, 20 m S of Tonolli Road	12	9250		
lawn, NW section of "Samuel" front lawn	13	1750		
lawn, centre of "Samuel" front lawn	14	1550		
boulevard, W side opposite Caterpillar Road	15	2950		
lawn, SE corner of "Samuel" front lawn	16	1850		
lawn, SW corner of "Samuel" front lawn	17	1250		24
boulevard, W side, S of service road entrance	18	3600		
lawn, front of 2276 Dixie Rd.	19	1450		110
boulevard, W side, N of Queensway	20	2900		
lawn, N of sidewalk, front of "BBC"	21	1200		
lawn, S of sidewalk, front of "BBC"	22	1400		100
boulevard, E side at "BBC" entrance	23	6100		
boulevard, E side, NE corner "Grace" property	24	8000		
lawn, N section, "Grace" front lawn	25	2200		
lawn, centre section, "Grace" front lawn	26	1900		340
boulevard, E side, 20 m N of Caterpillar Rd.	27	3000		
lawn, S section, "Grace" front lawn	28	1500		
lawn, N section, "BNI" front lawn	29	1650		
lawn, centre section, "BNI" front lawn	30	1500		560
lawn, S section, "BNI" front lawn	31	1200		
vacant lot, "2251" Dixie Rd., W half	32	1950		
vacant lot, "2251" Dixie Rd., E half	33	2200		
boulevard, E side, at Hydro right-of-way	34	780		
Hydro right-of-way, 40 m E of Dixie Rd.	35	185		32
Hydro right-of-way, 200 m E of Dixie Rd.	36	200		
boulevard, E side, behind 1423 Safeway Cres.	37	1300		
boulevard, E side, behind 1397 Safeway Cres.	38	1300		400
boulevard, E side, 30 m N of Sherway Dr.	39	1900		

TABLE 2 (Cont'd)

Location	Loc. Code	Soil Lead Concentration (µg/g) Sampling Depth in cm (0-5)	(15-20)	(0-15)
Queensway East				
boulevard, SE corner Queensway and Stanfield Rd.	40	205*		
orchard, N side, SW section	41	400*		
orchard, N side, SE section	42	255*		
orchard, N side, NE section	43	200		73
boulevard, N side, 5th lamp pole W of Dixie Rd.	44	555		
boulevard, N side, 3rd lamp pole W of Dixie Rd.	45	965		
boulevard, N side, 1st lamp pole W of Dixie Rd.	46	330		
boulevard, centre of roadway, E of Hydro tower	47	2350		
field, E of "BNI"	48	1250		
boulevard, N side, W of "Finlayson" building	49	590		
boulevard, centre of roadway, E of Hydro tower	50	590		
boulevard, N side, W end of "Caterpillar"	51	135		16
boulevard, N side, middle section of "Caterpillar"	52	445		
boulevard, centre of roadway, E of Hydro tower	53	515		
boulevard, N side, 30 m E of "Caterpillar"	54	240		
field, W of "Caterpillar", 60 m N of road	55	101		
boulevard, N side, 100 m E of "Caterpillar"	56	220		
boulevard, N side, opposite Greenhurst Drive	57	315		
Stanfield Road				
side yard, S side 2351 Stanfield Rd.	58	90		
lawn, between "Aluminart" and "Revlon"	59	70		
along fence, NE corner of commercial mall	60	106		
along fence, NW corner of commercial mall	61	87		
Hydro right-of-way, at Stanfield Rd.	62	53*		
Blundell Road				
field, between 1224 Dundas St. and Blundell Rd.	63	46		
field, as above but approximately 100 m S	64	42		
soil strip, behind 1224 Dundas St., at railway	65	310		
boulevard at end of Blundell Rd.	66	110		
soil strip, N of railway embankment	67	335**		
boulevard, S side, front of 1314 Blundell Rd.	68	130		43
soil strip, N of railway, 100 m W of Dixie	69	685		
grassed area, rear of 1331 Blundell Rd.	70	88		
boulevard, N side, opposite 1364 Blundell Rd.	71	98		

TABLE 2 (Cont'd)

Location	Loc. Code	Soil Lead Concentration (µg/g) Sampling Depth in cm (0-5)	(15-20)	(0-15)
Tonolli Road				
cultivated field, N section	72			135
cultivated field, centre section	73			120
cultivated field, S section	74			155
field, near Tonolli Road, S of laneway	75	925		
field, near Tonolli Road, W of parking area	76	2300		
soil piles, N edge of parking area	77			1300
ditch, S side of laneway, W of "Tonolli Co."	78	500		
field, W of "Tonolli Co." fence, near lane	79	1650		
field, S of parking area, near road	80	4750		
boulevard, S side, corner of "Samuel" building	81	1500		
boulevard, N side, along wall at "Tonolli Co."	82	360		
boulevard, S side, off NE corner "Samuel" building	83	4050		
boulevard, N side, opposite "Samuel" transformer	84	35000		
Caterpillar Road				
boulevard/ditch, N side, S of "Grace"	85	1600		
boulevard/ditch, N side, SE corner "Grace"	86	775		
field, N of Caterpillar Road, E of "Grace"	87	225		
parking lot, E of "BBC"	88	980**		
field, E of "BBC", near apple tree	89	400		
field, E of "Caterpillar", at stream	90	175*		
Venta Avenue				
boulevard, S side, 50 m E of Dixie Rd.	91	435	45	
boulevard, S side, opposite Denise Road	92	455		
Sherway Drive				
Islamic Public School, playing field lawn	93	240		
Islamic Public School, slides area	94	35		
Islamic Public School, horse swings area	95	24		

* 1985 data
** 0-2 cm sampling depth

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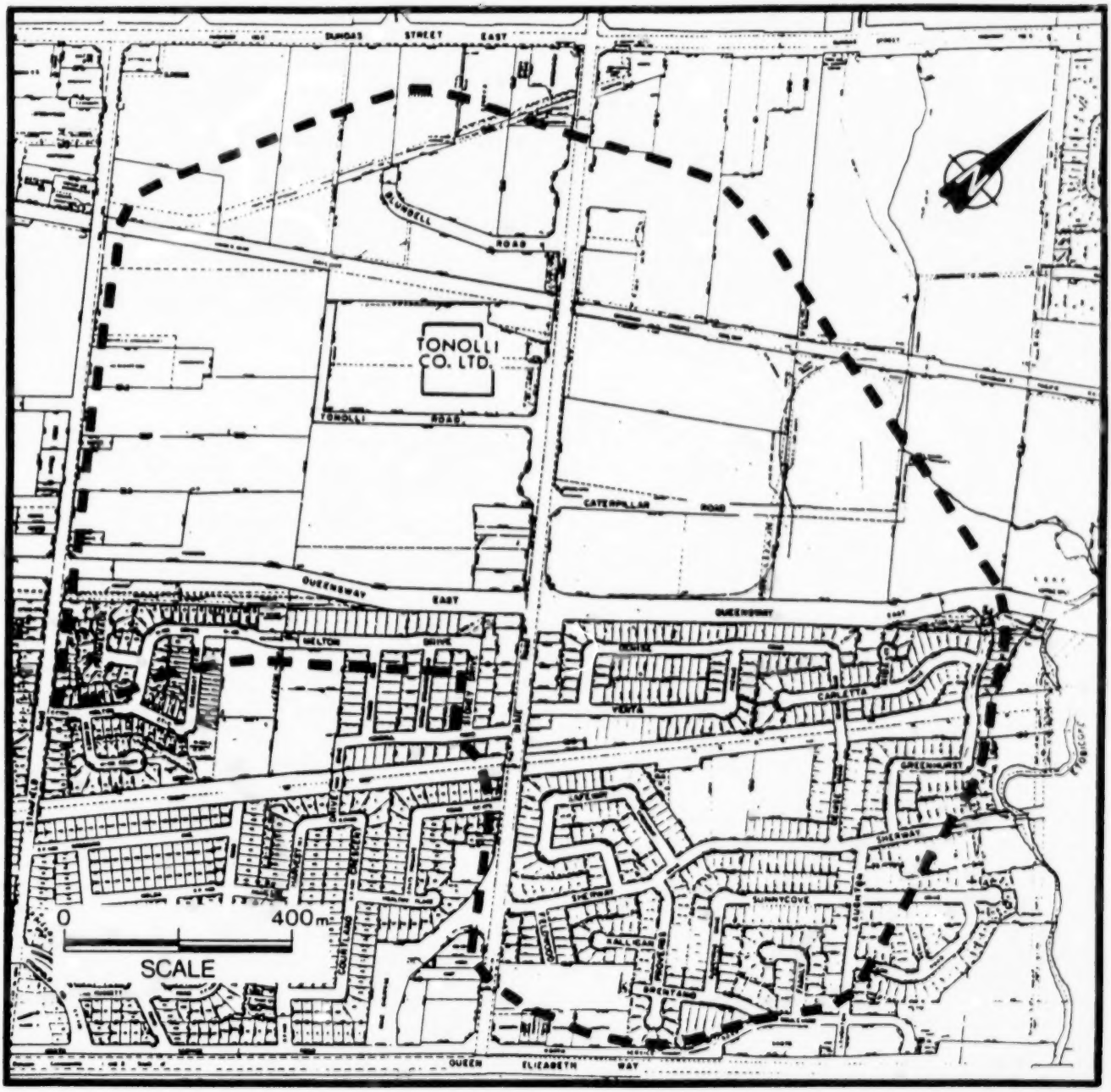

Figure 1 - Area from which soil samples were taken in the vicinity of Tonolli Co. of Canada Ltd., Mississauga, 1987.

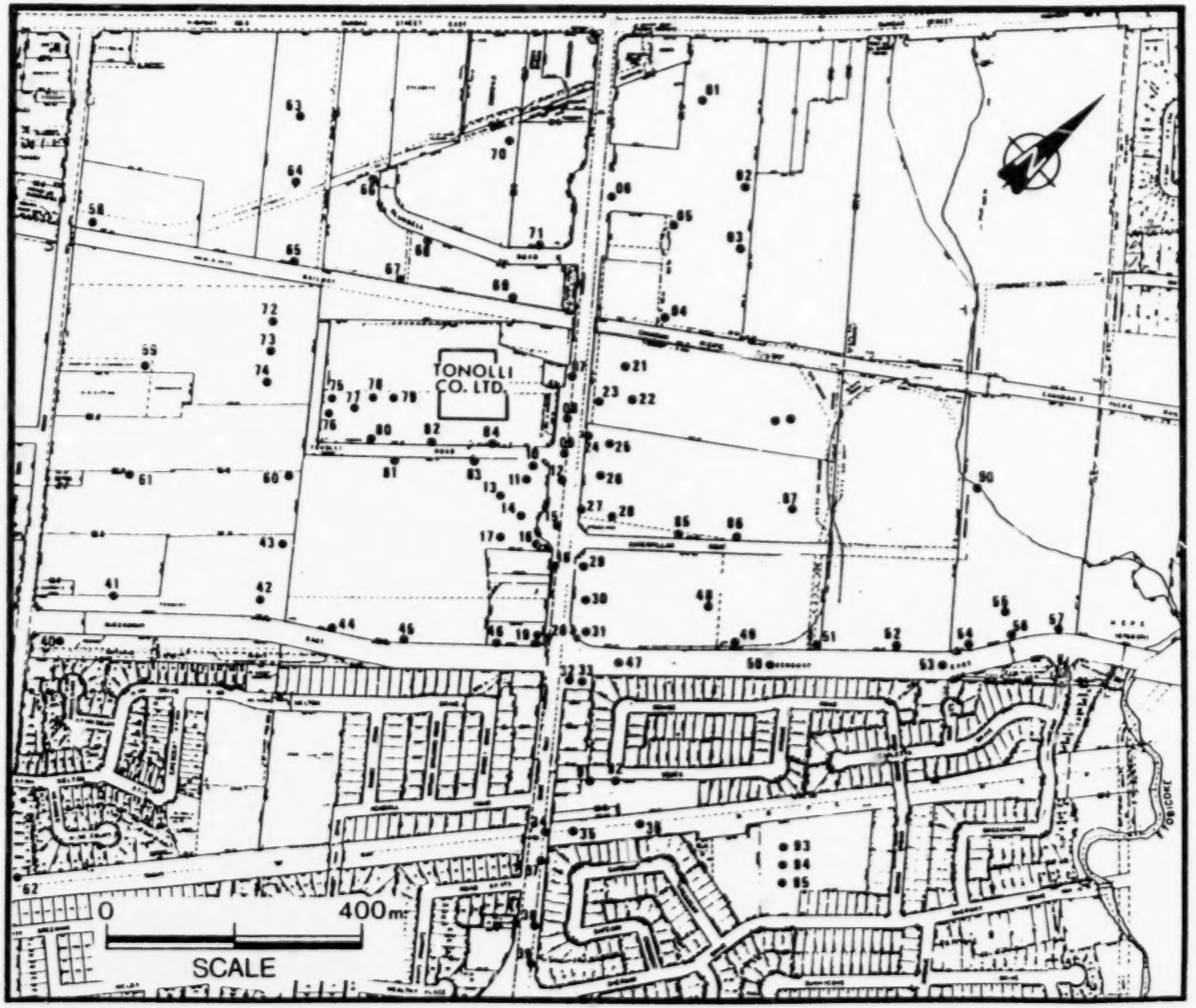

Figure 2 - Location of soil sampling sites on public and publicly accessible commercial properties in the vicinity of Tonolli Co. of Canada Ltd., Mississauga, 1987.

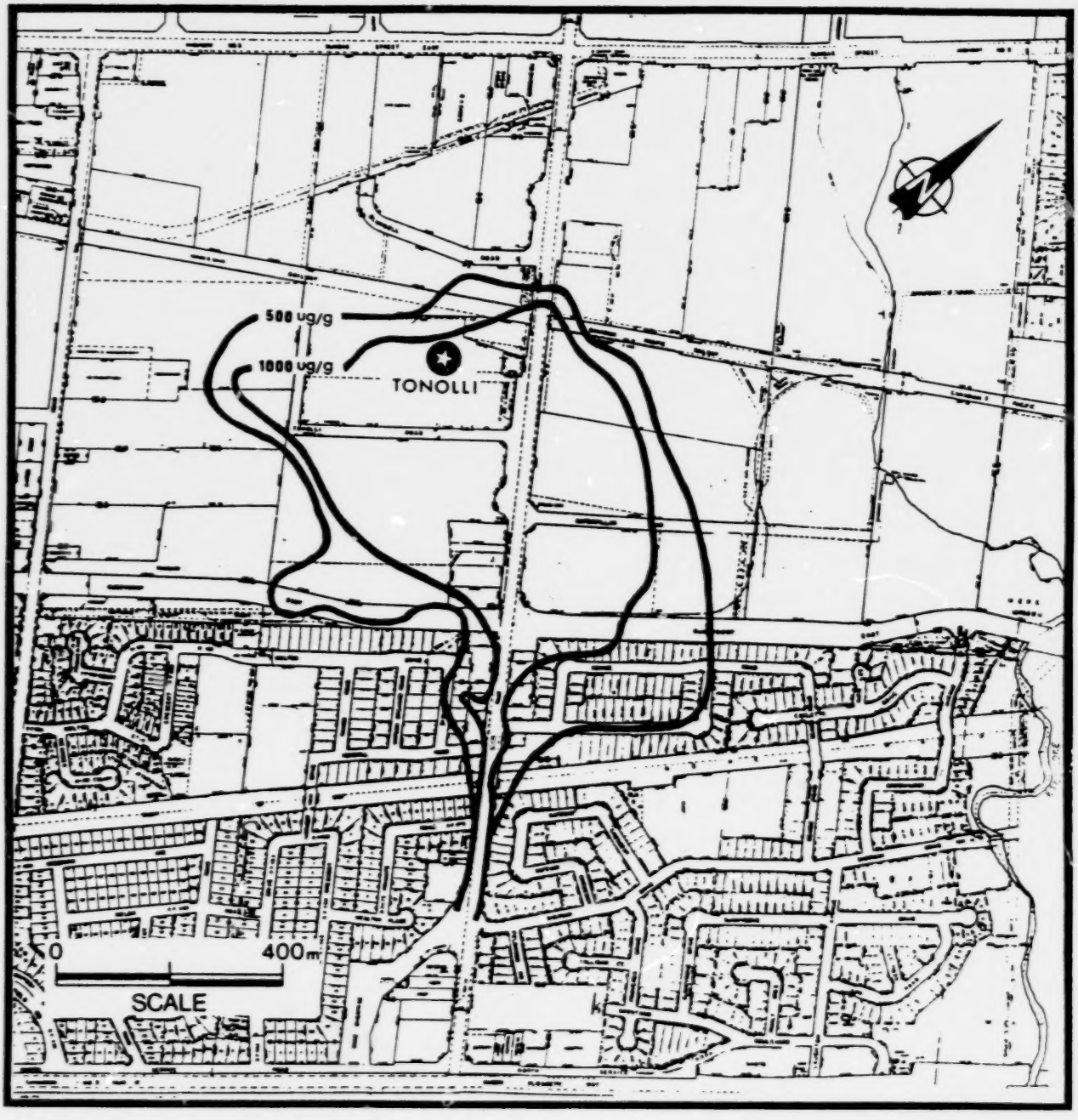

Figure 3 - Contour map of lead concentrations in surface soil (0-5 cm depth) in the vicinity of Tonolli Co. of Canada, Mississauga, 1987.